State of California
The Resources Agency
Department of Fish and Game

RECOVERY STRATEGY FOR CALIFORNIA COHO SALMON

Report to the California Fish and Game Commission

Prepared by
The California Department of Fish and Game

Species Recovery Plan Report 2003-1

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1 Introduction

Coho salmon (*Onchorynchus kisutch*) have experienced a significant decline in the past 40 to 50 years. Coho salmon abundance, including hatchery stocks, has declined at least 70% since the 1960s, and is currently 6 to 15% of its abundance during the 1940s. Coho salmon harvest decreased considerably in the late 1970s, despite a fairly stable rate of hatchery production. Recent abundance-trend information for several stream systems along the central and north coasts indicates an overall declining trend throughout the California.

As a result, the Commission received a petition to list coho salmon north of San Francisco to the Oregon border as an endangered species under the California Endangered Species Act (CESA). The Department prepared a comprehensive status review of the species, which recommended that the species be listed as endangered south of Punta Gorda to San Francisco Bay and threatened north of Punta Gorda to the California-Oregon border. The Commission found the recommendation to be warranted, but deferred regulatory action to add the species to the threatened and endangered species lists, and directed the Department to prepare a recovery strategy for coho salmon. This report fulfills that mandate.

1.1 STATE OF CALIFORNIA COHO SALMON LISTING ACTIONS

On December 16, 1993, the Santa Cruz County Fish and Game Advisory Commission submitted a petition to the California Fish and Game Commission (Commission) to list coho salmon south of San Francisco Bay under CESA. On April 7, 1994, the Commission designated the coho salmon south of San Francisco Bay a candidate species, starting the one-year review process by the Department. Based on this review, the Department recommended that coho salmon south of San Francisco Bay be listed as endangered. The Commission accepted the recommendation and listed those coho salmon as endangered, effective December 31, 1995.

On July 28, 2000, the Commission received a petition to list coho salmon north of San Francisco as an endangered species under CESA. The Commission referred the petition to the Department on August 7, 2000, for evaluation. The Department found that the information in the petition was sufficient to indicate the action may be warranted and recommended that the Commission accept the petition. The petition was accepted by the Commission on April 5, 2001. On April 27, 2001 the

Commission published a Notice of Findings in the California Regulatory Notice Register declaring coho salmon a candidate species, thereby starting the candidacy period. Pursuant to Fish and Game Code section 2074.6, the Department prepared a status review evaluating the status separately for the two coho salmon Evolutionary Significant Units (ESU) that occur in California. (See Section 1.2 below regarding ESUs.) The Department recommended that coho be listed as endangered from Punta Gorda south to San Francisco Bay and threatened north of Punta Gorda to the California-Oregon border.

On August 30, 2002, the Commission found that coho salmon warranted listing as an endangered species under CESA from San Francisco Bay north to Punta Gorda and as a threatened species from Punta Gorda north to the California-Oregon border. However, the Commission deferred regulatory action to add the species to the state threatened and endangered species lists while a recovery strategy is prepared, keeping in place regulations allowing for take of coho, which were adopted by the Commission pursuant to Fish and Game Code section 2084 in April 2001.

1.2 FEDERAL COHO SALMON LISTING ACTIONS

Coho salmon in California, Oregon, Washington, and Idaho were petitioned for listing under the Federal Endangered Species Act (ESA) by Oregon Trout, Pacific Rivers Council, and others in 1993. National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries, formerly National Marine Fisheries Service or NMFS [1]) identified six ESUs of coho salmon in California, Oregon, and Washington. The ESUs in California are the California Central Coast (CCC) Coho ESU and the Southern Oregon-Northern Coastal Californinia (SONCC) Coho ESU. The CCC ESU extends from the San Lorenzo River in Santa Cruz County north to Punta Gorda in Humboldt County (Federal Register 1996). The SONCC Coho ESU begins at Punta Gorda and extends north into Oregon to Cape Blanco (Federal Register 1997). The CCC Coho ESU and SONCC Coho ESU were listed as threatened on December 2, 1996 and June 5 1997, respectively (Federal Register 1996, 1997).

The status of California coho salmon populations was recently reviewed and updated by NMFS Southwest Fisheries Science Center (NMFS 2001a). This status review update confirms previous conclusions of the NOAA Fisheries Biological Review

[1] National Marine Fisheries Service (NMFS) now goes by the acronym NOAA Fisheries. NMFS is used in direct quotations and for citations to documents that were published when NMFS was the name of the organization; otherwise, NOAA Fisheries is used in this document.

Team: the CCC ESU is presently in danger of extinction[2] and the condition of coho salmon is worse than indicated by previous reviews. The California portion of the SONCC Coho ESU warrants threatened status and is likely to become endangered in the foreseeable future. NOAA Fisheries is presently updating status reviews and revisiting listing determinations for all salmon and steelhead ESUs that have one or more hatchery populations included in the ESU. This includes both the CCC and SONCC Coho ESUs.

1.3 STRATEGIC PLANNING FOR RECOVERY

Planning for recovery is a complex process that involves both state and federal actions. This section describes actions of the Commission, the recovery teams that were assembled to aid the Department in its development of a coho salmon recovery strategy (recovery strategy), and the federal government's preliminary steps toward a Federal Recovery Plan.

1.3.1 FISH AND GAME COMMISSION ACTION

Following the determination that coho salmon warranted CESA listing, rather than proceeding immediately with regulatory action, the Commission, pursuant to Fish and Game Code section 2114, directed the Department to prepare a recovery strategy for coho salmon within 12 months under Fish and Game Code section 2105 et seq. The Department immediately embarked on establishing two recovery teams: a California statewide coho recovery team and a local team for a special focus on agricultural water and land use in the Shasta and Scott River valleys. The Department sought innovative ideas and creativity in the development of a strategy that balances coho salmon recovery with other interests. Both teams brought together people with a variety of concerns and perspectives. The efforts of the two teams aided the Department in the development of a single recovery strategy to recover coho salmon throughout its range in California.

1.3.2 CALIFORNIA STATEWIDE RECOVERY TEAM

The California Statewide Recovery Team (CRT) is made of 21 members from a wide range of interests, professions, and perspectives. The team represents county, state, and federal governments, Indian tribes, commercial and recreational fishing, forestry, agriculture, ranching, water management, and environmental interests. The CRT first

[2] Extinction can describe the loss of all living members of a species, or more localized losses of geographic units smaller than the entire species. Extinction is used in this document to describe losses at various sub specific levels such as local geographic groups, populations, watersheds, runs, ESUs (or portions of them), and/or across the species range in California. The Department has qualified the term extinction in the text in an effort to make clear which level is being discussed.

met and commenced its work in December 2002. It undertook many significant issues: degraded habitat and depleted population numbers; prioritizing recovery actions across the range of both ESUs; water quality, quantity and use; county and other agencies carrying on their necessary work; agriculture, forestry, and ranching; legacy effects of activities that took place decades ago; monitoring of habitat improvement efforts and coho salmon population numbers; respecting private property rights; incentives to promote voluntary efforts to improve habitat; and restoration of tribal, recreational, and commercial fisheries.

The CRT recognizes that recovery of the coho salmon requires a cooperative effort across entire watersheds, considerable financial investment, and many years of effort. The CRT developed a mission statement to guide their effort to aid the Department:

> *Within our vision of restoring populations of coho salmon, including healthy, wild, naturally reproducing populations throughout its range, and restoring tribal, commercial, and recreational fisheries in California, it is our mission to aid the Department in the development of a recovery strategy for coho salmon, with the goal that the species will longer warrant listing.*

1.3.3 SHASTA-SCOTT RIVER RECOVERY TEAM

The Scott-Shasta River recovery team (SSRT) is made up of 13 members representing a variety of interests in the two valleys in Siskiyou County. Members include landowners, local governments, state and federal agencies, environmental groups, and recreational anglers. The SSRT held its first meeting in January 2003 and was tasked with assisting the Department in development of recommendations that will help recover coho salmon relative to agricultural water and land uses in the Shasta and Scott River valleys. The focal points for the SSRT were to restore coho salmon populations, maintain healthy agricultural industry, and address water management in each valley.

1.3.4 FEDERAL TECHNICAL REVIEW TEAMS

NOAA Fisheries is in the process of developing scientifically based criteria for delisting ESUs of anadromous salmonids, including the CCC and SONCC ESUs of coho salmon. Federal recovery efforts are focused on geographically defined Recovery Domains, of which there are four in California. There are two phases in the Federal recovery planning process for anadromous salmonids. Phase I is the development of Technical Recovery Goals. These goals will be developed by Technical Review Teams (TRT), which will also be responsible for developing criteria that, when met, will allow listed species to be removed from the Federal Endangered Species List.

Four Recovery Domains exist in California, and TRTs have been created for both California Recovery Domains that include coho salmon. The TRTs are responsible for developing recovery criteria for all the listed salmonids in the recovery domain. The TRTs are composed of scientists from NOAA Fisheries, other federal and state agencies, local experts on salmon biology, and academia, and are chaired by a NOAA scientist. Department biologists are part of both coho salmon TRTs.

TRT activity will be the primary focus of all teams for the next several years. Both the Southern Oregon/Northern California and North-Central California Coast TRTs had their first meetings in October 2001.

1.4 RECOVERY STRATEGY FOR COHO SALMON IN CALIFORNIA

This recovery strategy is based on general goals identified in this section, which also describes the approach to recovery and implementation considerations.

1.4.1 GENERAL GOALS

The primary and statutorily required goal of the recovery strategy is to recover coho salmon to the point where the regulations or other protections for coho salmon listed under CESA are not necessary. The recovery strategy will incorporate an additional goal of restoring tribal, recreational, and commercial coho salmon fisheries in California.

The recovery strategy must meet specific conditions that are evaluated by the Commission (Fish and Game Code section 2111(a)-(d).)[3] These conditions are:

a. The strategy will conserve, protect, restore, and enhance coho salmon (as a species;

b. Both the strategy and the implementation schedule are capable of being carried out in a scientifically, technologically, and economically reasonable manner;

c. The strategy is supported by the best available scientific data; and

d. The strategy represents an equitable apportionment of both public and private and regulatory and nonregulatory obligations.

The approach to achieving the primary goal of recovery is to improve coho salmon populations and habitat so the species is neither threatened nor endangered with extinction throughout or in a significant portion of its range and the regulations or other protections for coho salmon under CESA are not necessary. Achieving this will involve a combination of five delisting requirements that address coho salmon

[3] Meeting the additional goal of restoring tribal, commercial, and recreational fisheries is not a requirement of the recovery strategy under Fish and Game Code section 2105 *et seq*.

populations and habitat. These recovery criteria are presented in a delisting framework.

The five recovery criteria or delisting requirements for coho salmon recovery in California are:

I. Maintain and protect the number and size of key populations of coho salmon.

II. Maintain and increase the number of spawning adults and maximize freshwater and estuary survival of juveniles in basins to a level that reduces the probability of extinction to an insignificant level.

III. Maintain, and increase the range and distribution of coho salmon to a level that reduces the probability of extinction of an ESU to an insignificant level.

IV. Maintain and protect habitat essential for coho salmon.

V. Maintain, restore, and enhance coho salmon habitat to a level that reduces the probability of extinction to an insignificant level.

An additional goal of the recovery strategy is to restore coho salmon numbers to the point where tribal, recreational, and commercial fishing may occur. This goal is not statutorily required by CESA. However, it is the intention of the Department to collaborate with the CRT, including the appropriate tribal and federal governments, and stakeholders once delisting is achieved and regulations and other protections under CESA are not necessary, to determine how to continue implementation of appropriate elements of the recovery strategy to accomplish this goal, pursuant to and consistent with other applicable local, state, and federal law and voluntary measures.

1.4.2 ELEMENTS NECESSARY TO ACHIEVE RECOVERY GOALS

The recovery strategy is centered on several elements necessary to achieve the goals of recovery. The foundation of recovery will be based on these elements and implementation of recovery actions at various biological and geographic levels. The Department's recovery elements are education and public outreach, emphasizing the cooperation and coordination of the public and private sectors, maximizing public lands for protection and recovery, and conducting research and monitoring to track and understand the progress of recovery and make needed changes over time to advance coho salmon recovery.

The recovery strategy takes the approach of dividing California coho salmon into geographic and biological units. The primary biological division is the ESU. With the CCC ESU being endangered and the SONCC ESU being threatened, the recovery strategy will have particular focused efforts in the CCC ESU. Additionally, as unique populations are identified within either ESU, specific directed actions may occur to promote the potential of recovery.

Geographic division, prioritization, and implementation of recovery actions are of paramount importance to the recovery strategy. This methodology maximizes: 1) efficiency of resources; 2) involvement and decision-making by local entities, watershed councils, and landowners; 3) effective identification and resolution of issues impacting coho salmon; and 4) information gathering and interpretation of population and habitat condition, effectiveness of recovery activities, and changes to coho salmon from land use and environmental fluctuation or processes. Entire watersheds and subunits of watersheds are the primary geographic divisions and are discussed watershed by watershed.

1.4.3 IMPLEMENTATION

The recovery strategy includes hundreds of potential actions to recovery coho salmon. The implementation of these actions will require long-term commitments and involvement of many parties and organizations, many years, and considerable financial support, and careful planning and management. The recovery strategy describes issues facing coho salmon and the many recommendations to address the issues. At the end of this document, the implementation schedule lists the prioritized action, the party or parties responsible or able to carry out the actions, the estimated commencement and duration, and the estimated cost.

1.4.3.1 Interim Actions

Some recommendations for recovery of coho salmon can be implemented immediately, both because there already is the economic and technical feasibility and because no regulatory or statutory change is required to start the recovery activity or decision. For the purposes of this recovery strategy, interim, or short-term, actions are defined as those actions that can be initiated immediately or within the first five years of the strategy and require no regulatory or statutory changes.

1.4.3.2 Long-term Actions

There are other recommendations that require more time and planning before they can be implemented, a long duration to complete, additional funding, or which would require changes to law or regulation to be successful or even allowable. These recommendations are categorized as long-term.

1.4.4 ADAPTIVE MANAGEMENT

The Department believes adaptive management[4] is essential for successful planning and implementation of coho salmon recovery. Adaptive management is the process of involving scientific method and the experience of stakeholders and resource

[4] Adapted from Taylor et al., 1997.

managers in an iterative process that allows for plan flexibility and responsiveness in revising the coho recovery strategy based on the best available scientific and other data. The recovery strategy is based on the current best available scientific and other information, but effects of human activities, stochastic natural events, the most effective management practices, and the means of addressing stakeholder issues or conflicts. As we learn more about these things, adaptive management allows the recovery strategy to benefit accordingly.

The recovery strategy's adaptive management process is a six-step cycle; the success of which depends on the completion of all six steps:

1. Assess the problem by identifying the issues facing coho salmon and habitat and evaluate the scientific, management, and economic options and feasibility of potential solutions.

2. Design and select of the policies, programs, and activities to be applied to recovery and additional assessment.,

3. Implement programs and activities for recovery of coho salmon and continuing assessment designed to reveal the critical knowledge that is currently lacking,

4. Monitor the key response indicators that inform the Department on the progress and effectiveness of recovery programs and activities and status and trend of coho salmon and habitat.

5. Evaluate recovery activities and programs and assessment and monitoring information.

6. Adjust and incorporate the results of implemenation and monitoring into future decisions and revisions of the recovery strategy.